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JUN 23 1965

CURRENT SERIAL RECORD

WATER SUPPLY OUTLOOK
and
FEDERAL - STATE - PRIVATE COOPERATIVE SNOW SURVEYS
for
WASHINGTON

UNITED STATES DEPARTMENT of AGRICULTURE...SOIL CONSERVATION SERVICE,
and
DEPARTMENT of CONSERVATION STATE of WASHINGTON

Data included in this report were obtained by the agencies named above in cooperation with the U.S. Forest Service, U.S. Geological Survey, National Park Service, and other Federal, State and private organizations.

AS OF
JUNE 1, 1965

UNITED STATES DEPARTMENT OF AGRICULTURE - SOIL CONSERVATION SERVICE

To Recipients of Water Supply Outlook Reports:

The climate of the cultivated and populated areas of the West is characterized by relatively dry summer months. Such precipitation as occurs falls mostly in the winter and early spring months when it is of little immediate benefit to growing crops. Most of this precipitation falls as mountain snow which stays on the ground for months, melting later to sustain streamflow during the period of greatest demand during late spring and summer. Thus, nature provides in mountain snow an imposing water storage facility.

The amount of water stored in mountain snow varies from place to place as well as from year to year and accordingly, so does the runoff of the streams. The best seasonal management of variable western water supplies results from advance estimates of the streamflow.

A snow survey consists of a series of about ten samples taken with specially designed snow sampling equipment along a permanently marked line, up to 1000 feet in length, called a snow course. The use of snow sampling equipment provides snow depth and water equivalent values for each sampling point. The average of these values is reported as the snow survey measurement for a snow course.

Snow surveys are made monthly or semi-monthly beginning in January or February and continue through the snow season until April, May or June. Currently more than 1400 western snow courses are measured each year. These measurements furnish the key data for water supply forecasts.

Streamflow forecasts are obtained by a comparison of total or maximum snow accumulation, as measured by snow water equivalent, to the subsequent spring and summer or snowmelt season runoff over a period of years. The snow water equivalent measured in selected snow courses provides most of the index to the streamflow forecast for the following season. More accurate forecasts are usually obtained when other factors such as soil moisture, base flow and spring precipitation are considered and included in the forecast procedure. Early season forecasts assume average climatic conditions through the snowmelt season.

Listed below are the Federal-State-Private Cooperative Snow Survey and Water Supply Forecast reports available for the West which contain detailed information on snow survey measurements, streamflow forecasts, reservoir storage, soil moisture and other guide data to water management and conservation decisions. Soil Conservation Service Reports may be secured from Soil Conservation Service, 511 N.W. Broadway - Room 507, Portland, Oregon 97209.

PUBLISHED BY SOIL CONSERVATION SERVICE

<u>REPORTS</u>	<u>ISSUED</u>	<u>LOCATION</u>	<u>COOPERATING WITH</u>
RIVER BASINS			
WESTERN UNITED STATES			
WESTERN UNITED STATES	MONTHLY (FEB.-MAY)	PORTLAND, OREGON	ALL COOPERATORS
BASIC DATA SUMMARY	OCTOBER 1	PORTLAND, OREGON	ALL COOPERATORS
STATES			
ALASKA	MONTHLY (MAR.-MAY)	PALMER, ALASKA	ALASKA S.C.D.
ARIZONA	SEMI-MONTHLY (JAN. 15 - APR. 1)	PHOENIX, ARIZONA	SALT R. VALLEY WATER USERS ASSOC. ARIZ. AGR. EXP. STATION
COLORADO AND NEW MEXICO	MONTHLY (FEB.-MAY)	FORT COLLINS, COLORADO	COLO. STATE UNIVERSITY COLO. STATE ENGINEER N. MEX. STATE ENGINEER
IDAHO	MONTHLY (JAN.-JUNE)	BOISE, IDAHO	IDAHO STATE RECLAMATION ENGINEER
MONTANA	MONTHLY (JAN.-JUNE)	BOZEMAN, MONTANA	MONT. AGR. EXP. STATION
NEVADA	MONTHLY (JAN.-MAY)	RENO, NEVADA	NEVADA DEPT. OF CONSERVATION AND NATURAL RESOURCES DIVISION OF WATER RESOURCES
OREGON	MONTHLY (JAN.-JUNE)	PORTLAND, OREGON	OREG. STATE UNIVERSITY OREGON STATE ENGINEER
UTAH	MONTHLY (JAN.-JUNE)	SALT LAKE CITY, UTAH	UTAH STATE ENGINEER
WASHINGTON	MONTHLY (FEB.-JUNE)	SPOKANE, WASHINGTON	WN. STATE DEPT. OF CONSERVATION
WYOMING	MONTHLY (FEB.-JUNE)	CASPER, WYOMING	WYOMING STATE ENGINEER

PUBLISHED BY OTHER AGENCIES

<u>REPORTS</u>	<u>ISSUED</u>	<u>AGENCY</u>
BRITISH COLUMBIA	MONTHLY (FEB.-JUNE)	WATER RESOURCES SERVICE, DEPT. OF LANDS, FOREST AND WATER RESOURCES, PARLIAMENT BLDG., VICTORIA, B.C., CANADA
CALIFORNIA	MONTHLY (FEB.-MAY)	CALIF. DEPT. OF WATER RESOURCES, P.O. BOX 388, SACRAMENTO, CALIF.

FEDERAL-STATE-COOPERATIVE
SNOW SURVEY AND WATER SUPPLY FORECASTS

For

WASHINGTON

Report Prepared
By

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Issued By

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State Conservationist
Soil Conservation Service
U. S. Department of Agriculture

Murray G. Walker, Supervisor
Division of Water Resources
Department of Conservation
State of Washington

WATER SUPPLY OUTLOOK

State of Washington

June 1, 1965

*
The water supply outlook for irrigation and power in the State of
Washington has deteriorated somewhat from that which was report-
ed last month. The snow line has receded only until the highest
elevation snow courses have reported measurable amounts of snow
Only a few of the courses measured have a greater snow pack than
normal as of the first of June, and even fewer had an above nor-
mal pack as of the fifteenth of May.
* *

SNOW COVER

Only a few of the many snow courses in the State and tributary areas are measured either on May 15 or June 1. While some of these courses improved, percentagewise, from previous measurements, the general trend was a reduction of about 10 percent from the measurements of May 1. The snow line is steadily receding with much of the snow water evaporating. In certain areas precipitation is needed in the form of rain to bring off the remaining snow to fill the local reservoirs.

SOIL MOISTURE

The cool weather of May helped the soil moisture picture but the lack of precipitation didn't. The soils are drying out in the surface area, but below this zone the soil mantle is still quite wet. Temperatures averaged from 1 to 3 degrees below normal during May, and precipitation was mostly less than 50 percent with some stations reporting as little as 7 percent of normal rainfall. The only area that can be considered good was the northwest section of the State.

STREAMFLOW

Runoff during the month was all well below normal for the reporting stations, with the exception of the Snake at Clarkston. The Walla Walla, as measured at Touchet, had only a 42 percent of normal flow for the lowest, and the Columbia at The Dalles was reported to have a 95 percent flow. Forecasts are not made but it is expected that the runoff during the rest of snow melt season and following will be less than previously reported.

RESERVOIRS

Most reservoirs are in good shape for this time of year. The reservoirs are either full or have been held low for flood control purposes. Salmon Lake and Reservoir, formerly called Connelly Reservoir, are the only two reservoirs that are not likely to fill. There is enough water for this year's irrigation but the holdover storage for next year's irrigation could be low.

RESERVOIR STORAGE - 1000 Acre Feet

BASIN or STREAM	RESERVOIR ^{1/}	USABLE CAPACITY	Measured (June 1)			
			1965	1964	1963	Normal*
<u>COLUMBIA</u>						
Spokane	Coeur d'Alene Lake	889.0	272.4	424.9	194.2	357.9
Columbia	Franklin D. Roosevelt Lake	5232.0	3505.0	3370.0	4063.0	4381.2
Columbia	Banks Lake ^{2/}	761.8	363.6	320.0	281.0	463.3
Okanogan	Conconully Reservoir	13.0	5.6	5.1	11.2	11.8
Okanogan	Salmon Lake	10.5	9.2	9.5	8.1	9.9
Chelan	Lake Chelan	676.1	582.0	329.9	595.4	490.2
<u>YAKIMA</u>						
Yakima	Keechelus Lake	157.8	153.2	106.3	160.0	140.5
Kachess	Kachess Lake	239.0	232.6	208.7	242.8	229.4
Cle Elum	Lake Cle Elum	436.9	411.8	241.6	442.5	410.3
Bumping	Bumping	33.7	24.8	19.5	36.0	33.1
Tieton	Rimrock Lake	198.0	194.1	94.5	200.2	184.3
<u>PUGET SOUND</u>						
Skagit	Ross Reservoir ^{1/}	1202.9	1126.7	827.6	1315.1	854.3
Skagit	Diablo Reservoir	90.6	82.6	84.1	85.9	84.2
Skagit	Gorge Reservoir	9.8	7.9	8.5	7.9	--

1/ Based on active storage

2/ Less than 15-year record in period 1948-62

* 15-year average 1948-62

SOIL MOISTURE - JUNE

Drainage Basin and Station	Number	Elev.	Profile (Inches) : Soil Moisture Content				
			Depth	Total Capacity : 1965	(Inches)	as of June 1	1964
CRAB CREEK							
Creston-Kunz	18B1m	2440	48	13.6	8.95	10.50	9.03
Govan	18B2m	2100	48	13.6	Destroyed	7.41	10.86
Jack Woods	18B3m	2600	48	13.6	7.83	6.67	8.94
Krause	18B4m	2440	48	13.6	8.21	8.43	8.74
Sheffels	18B5m	2360	48	13.6	8.30	4.85	6.62
Wheatridge	18B6m	2200	48	13.6	6.46	6.76	7.07
OKANOGAN							
Trout Creek	3-M	3600	48	7.3	4.19	5.34*	4.19*
YAKIMA							
Lake Cle Elum	21B14M	2200	48	12.8	9.10	9.17	11.00
WALLA WALLA							
Couse	17C3m	3650	48	11.1	10.51	8.19	8.93
Helmers	17C2M	4400	48	12.0	11.92	11.17	11.19

* May 1 measurement

FALL SOIL MOISTURE

Drainage Basin and Station	Number	Elev.	Profile (Inches) : Soil Moisture Content				
			Depth	Total Capacity : 1964	(Inches)	as of Oct. 1	1963
CRAB CREEK							
Creston-Kunz	18B1m	2440	48	13.6	5.43	5.12	9.40
Govan	18B2m	2100	48	13.6	Destroyed	5.79	9.95
Jack Woods	18B3m	2600	48	13.6	4.44	6.26	7.06
Krause	18B4m	2440	48	13.6	5.80	5.23	9.47
Sheffels	18B5m	2360	48	13.6	3.60	3.69	6.69
Wheatridge	18B6m	2200	48	13.6	4.10	4.50	7.49
OKANOGAN							
Trout Creek	3-M	3600	48	7.3	3.34	3.23	2.80
YAKIMA							
Lake Cle Elum	21B14M	2200	48	12.8	8.80	6.63	6.80
WALLA WALLA							
Couse	17C3m	3650	48	11.1	5.62	5.73	7.20
Helmers	17C2M	4400	48	12.0	6.01	5.75	7.60

APPENDIX 1

SNOW DATA - MAY 15 & JUNE 1, 1965

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT							
			1965		Past Record					
			Date of Survey	Snow Depth (In.)	Water Content (In.)	Water Content (In.) : 1964	1963	Avg.		
<u>UPPER COLUMBIA DRAINAGE</u>										
<u>PEND OREILLE RIVER</u>										
Nelson	Canada	3050	5/14	3	1.7	4.3	0.0	0.8**		
<u>KETTLE RIVER</u>										
Monashee Pass	Canada	4500	5/14	15	6.9	13.2	10.3	11.6**		
			5/31	2	1.0	8.7	0.0	3.6**		
Old Glory Mountain	Canada	7000	5/14	51	25.7	34.8	25.9	28.9**		
			6/1	31	16.8	24.5	7.7	17.7**		
<u>OKANOGAN RIVER</u>										
Blackwall Mountain	Canada	6250	5/16	66	32.3	49.2	32.1	37.5**		
			6/2	65	30.8	44.1	17.6	29.3**		
Hamilton Hill	Canada	4900	5/15	8	3.3	13.4	4.1	--		
			5/29	0	0.0	2.4	0.0	0.5**		
Lost Horse Mountain	Canada	6300	5/15	32	9.4	13.9	7.9	10.2**		
			5/31	13	5.1	5.4	1.3	4.2**		
McCulloch	Canada	4200	5/14	2	0.5	1.8	0.4	0.8**		
Misseezula Mountain	Canada	5100	5/16	0	0.0	6.3	0.0	0.0**		
Mission Creek	Canada	4500	5/14	40	18.8	23.2	20.2	18.8**		
			5/30	29	12.6	20.5	4.6	10.5**		
Monashee Pass	Canada	4500	5/14	15	6.9	13.9	10.3	11.6**		
			5/31	2	1.0	8.7	0.0	3.6**		
Silver Star Mountain	Canada	6050	5/14	40	19.4	33.0	23.3	24.7**		
			6/1	21	11.0	25.0	5.6	14.6**		
Trout Creek	Canada	4700	5/16	4	1.1	1.9	0.7	1.2**		
<u>WENATCHEE RIVER</u>										
Stevens Pass	21B1	4070	5/19	86	41.2	72.7	27.3	48.7*		
			6/2	60	31.9	60.3	7.5	29.5*		
<u>YAKIMA RIVER</u>										
Bumping Lake	21C8	3450	5/15	0	0.0	4.2	0.0	5.0*		
Lake Cle Elum	21B14M	2200	5/15	0	0.0	0.0	0.0	--		

* Adjusted 1948-62 average

** Average for years of record

APPENDIX 2

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT						
			1965		Past Record				
			Date of Survey (In.)	Snow Depth (In.)	Water Content (In.)	Water Content (In.)	1948-62		
<u>YAKIMA RIVER (Cont'd)</u>									
#Stampede Pass	21B10	3000	5/14	69	38.2	63.1	16.2	35.1*	
			6/1	36	21.8	61.9	0.0	17.3*	
Tunnel Avenue	21B8	2450	5/14	9	4.5	24.5	0.0	9.2*	
			6/1	0	0.0	13.9	0.0	--	
White Pass (Ea.Side)	21C28	4500	5/14	37	17.6	28.4	--	25.4*	
			5/26	23	12.1	23.8	0.0	--	
<u>LOWER COLUMBIA DRAINAGE</u>									
<u>COWLITZ RIVER</u>									
White Pass(Ea.Side)	21C28	4500	5/14	37	17.6	28.4	--	25.4*	
			5/26	23	12.1	23.8	0.0	--	
<u>PUGET SOUND DRAINAGE</u>									
<u>GREEN RIVER</u>									
Stampede Pass	21B10	3000	5/14	69	38.2	63.1	16.2	35.1*	
			6/1	36	21.8	61.9	0.0	17.3*	
<u>SKYKOMISH RIVER</u>									
#Stevens Pass	21B1	4070	5/19	86	41.2	72.7	27.3	47.8*	
			6/2	60	31.9	60.3	7.5	29.5*	
<u>BAKER RIVER</u>									
Dock Butte	21A11A	3800	5/14	124	62.6	106.6	46.6	--	
			Late Report		+	95.3	--	--	
Easy Pass	21A7A	5200	5/15	165	83.5	136.6	75.2	--	
			Late Report		+	118.7	--	--	
Jasper Pass	21A6A	5400	5/14	172	84.3	118.2	81.1	--	
			Late Report		+	109.0	--	--	
Marten Lake	21A9A	3600	5/14	146	71.7	115.7	49.2	--	
			Late Report		+	104.8	--	--	
Rocky Creek	21A12A	2100	5/14	8	3.0	29.3	--	--	
			Late Report		+	5.4	--	--	

+ Snow water equivalent estimated from aerial stadia observation

* Adjusted 1948-62 average

Not directly on this drainage

APPENDIX 3

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT					
			1965	P a s t	R e c o r d	Date	Snow	Water : Water Content (In.)
			of	Depth Content:	1948-62			

BAKER RIVER (Cont'd)

Schreibers Meadow	21A10A	3400	5/14	110	54.8	90.5	35.3	--
			Late Report		+	76.0	--	--
S. F. Thunder Creek	21A14A	2200	5/14	0	0.0	0.0	--	--
Sulphur Creek	21A13	1600	5/14	0	0.0	8.9	--	--
Watson Lakes	21A18A	4500	5/14	136	65.1	94.4	49.9	--
			Late Report		+	86.7	--	--

+ Snow water equivalent estimated from aerial stadia observation

Agencies Assisting with Snow Surveys

GOVERNMENT AGENCIES

Canada:

Department of Lands, Forests and Water Resources,
Water Resources Service, British Columbia

States:

Washington State Department of Conservation
Washington State Department of Natural Resources

Federal:

Department of the Army
Corps of Engineers
U. S. Department of Agriculture
Forest Service
U. S. Department of Commerce
Weather Bureau
U. S. Department of the Interior
Bonneville Power Administration
Bureau of Reclamation
Geological Survey
National Park Service

PUBLIC AND PRIVATE UTILITIES

Chelan County P.U.D.
Pacific Power and Light Company
Puget Sound Power and Light Company
Washington Water Power Company

OTHER PUBLIC AGENCIES

Okanogan Irrigation District
Wenatchee Heights Irrigation District

MUNICIPALITIES

City of Walla Walla
City of Tacoma
City of Seattle

Other organizations and individuals furnish valuable information for snow survey reports. Their cooperation is gratefully acknowledged.

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
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